ORGANIZED BY:

June 5-7, 2018  |  Spartanburg, South Carolina

ADVANCING INDUCTION TECHNOLOGIES

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Inductor Design
Modeling + Optimization

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June 5 – 7, 2018

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Sample Preparation

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THERMAL PROCESSING IN MOTION

ABOUT THE EVENT:
Thermal processing is critical for the safe and efficient operation of transportation (Aircraft, Rail and Automotive), as well as agricultural equipment. Heat treatment is designed to increase fatigue, wear or tensile properties to satisfy a material need. Constraints of fuel efficiency, cost and customer demand, are driving increased performance. At the same time, global demands are driving reductions in cost.

Learn the latest research and developments in your field during sessions focused on Advances in Thermal Processing; Additive Manufacturing; Phase Transformations; Microstructure/Property Relationships; Quenching and Quenchants; Thermomechanical Thermal Processing; Surface Hardening; and MUCH MORE!

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REGISTRATION SCHEDULE

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<tr>
<th>DAY/DATE</th>
<th>HOURS</th>
<th>LOCATION</th>
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</thead>
<tbody>
<tr>
<td>Monday, June 4, 2018</td>
<td>2:00 p.m. – 6:30 p.m.</td>
<td>Heritage Ballroom Foyer</td>
</tr>
<tr>
<td>Tuesday, June 5, 2018</td>
<td>7:00 a.m. – 5:30 p.m.</td>
<td>Heritage Ballroom Foyer</td>
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<tr>
<td>Wednesday, June 6, 2018</td>
<td>7:00 a.m. – 5:30 p.m.</td>
<td>Heritage Ballroom Foyer</td>
</tr>
<tr>
<td>Thursday, June 7, 2018</td>
<td>7:00 a.m. – 12:00 p.m.</td>
<td>Heritage Ballroom Foyer</td>
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</table>

EXHIBIT DATES AND TIMES
Location: Heritage EF

Monday, June 4
Welcome Reception ................................. 5:30 p.m. – 7:00 p.m.

Tuesday, June 5
Refreshment Break ......................... 10:00 a.m. – 10:30 a.m.
Lunch ............................................. 12:30 p.m. – 2:00 p.m.
Refreshment Break ......................... 3:30 p.m. – 4:00 p.m.

Wednesday, June 6
Refreshment Break ......................... 10:00 a.m. – 10:30 a.m.
Lunch ............................................. 12:30 p.m. – 2:00 p.m.
Surface Combustion has earned a trusted reputation over 100 years of providing rugged, reliable heat treating solutions equipped with the latest technology and backed by strong technical support. Surface strives to build customer relationships that endure long after the initial equipment purchase. When you require a thermal processing partner who can draw from a broad portfolio of proven designs, including pioneering atmosphere and vacuum products, let us show you the Value of Surface.
SESSION CHAIRS

REMINDER: Session Chairs should pick up their packets at the Registration Desk in the Heritage Ballroom Foyer. These packets include instructions and program information relevant to the day for you to pass along to your speakers.

SPEAKERS

REMINDER: All speakers should plan to meet in the room of your presentation 30 minutes prior to the start of your session in order to upload your presentation. This will allow all speakers the opportunity to meet their session chair and go over any final conference details and any audio visual concerns.

POLICY ON AUDIO AND VIDEO RECORDING OF TECHNICAL PAPER PRESENTATIONS/SESSIONS

ASM International® reserves the right to any audio and video reproduction of presentations at every technical session. Recording of sessions (audio, video, still photography, etc.) intended for personal use, distribution, publication or copyright without the express written consent of ASM and the presenter is strictly prohibited.

POLICY OF CELLULAR PHONE USAGE

In consideration of fellow event attendees and presenters, show management kindly requests your cooperation in minimizing disturbances which may occur during technical sessions. We ask that cellular phones or other electronic devices be placed in “silent mode” while you are in the meeting rooms. Please step outside the meeting room if you need to have a conversation.

PROCEEDINGS

Each full conference registrant will receive online access to the manuscripts. You should have received an email with a link to the proceedings and instructions on how to access them.

AMERICANS WITH DISABILITIES

In accordance with the Americans with Disabilities Act (ADA) of 1990, ASM International and the Spartanburg Marriott are striving to accommodate all of our guests with special needs. If a disability requires that you have access to modified housing, transportation or other assistance, please inform the venue and/or conference staff.

ASM ANTI-HARASSMENT POLICY

ASM International is dedicated to providing harassment-free events for everyone, regardless of age, race, religion, disability, gender, gender identity or sexual orientation. We do not tolerate harassment in any form from anyone attending an ASM event. Harassing behaviors include: offensive verbal comments related to age, race, religion, disability, gender, gender identity or sexual orientation; the use or display of sexual images, activities or commentary in public spaces; deliberate intimidation; stalking or following; harassing photography or recording; sustained disruption of events; or inappropriate physical contact. Participants asked to stop any harassing behavior are expected to comply immediately. Participants violating this policy may be sanctioned or expelled from the event or the membership at the discretion of ASM leadership.

EMERGENCY PROCEDURES DURING THIS ASM EVENT

During this ASM event attendees are to follow the established emergency guidelines of the facility where the emergency occurs. Based on the location of the incident, report emergencies to the nearest venue representative and/or security personnel if available, or report to the ASM operations office onsite.

Should a catastrophic event occur, attendees should follow the safety and security instructions issued by the facility at the time of the event. This includes listening for instructions provided through the public address system and following posted evacuation routes if required.
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D. Scott MacKenzie, Houghton International (USA)

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Clemson University - ICAR (USA)

Andy Banka
Air Flow Sciences (USA)

Joe Epperson
Retired, National Transportation Safety Board (USA)

Lynn Ferguson
Dante Solutions (USA)

Lesley Frame
University of Connecticut (USA)

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Arimotech Ltd (Japan)

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IFHTSE

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GearChem (Italy)

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Upper Austria University of Applied Sciences (Austria)

Bozo Smoljan
University of Rijeka (Croatia)

Xiaohui Tong
Chinese Heat Treaters Association (China)

Eva Troell
Ivf-Swerea (Sweden)

Han-Werner Zoch
Stiftung Institut für Werkstofftechnik (Germany)

PROCEEDINGS EDITORS
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Dante Solutions (USA)

Lesley Frame
University of Connecticut (USA)

Robert Goldstein
Fluxtrol (USA)

Dave Guisbert
QA Metallurgical Services (USA)

D. Scott MacKenzie
Houghton International (USA)
<table>
<thead>
<tr>
<th>DATE/TIME</th>
<th>EVENT</th>
<th>LOCATION</th>
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<tbody>
<tr>
<td>MONDAY, JUNE 4, 2018</td>
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<tr>
<td>8:30 a.m. - 4:00 p.m.</td>
<td>HTS Board Meeting</td>
<td>Wadsworth &amp; Croft</td>
</tr>
<tr>
<td>4:00 p.m. - 6:00 p.m.</td>
<td>IFHTSE Executive Committee Meeting</td>
<td>Daniel Morgan</td>
</tr>
<tr>
<td>2:00 p.m. - 5:30 p.m.</td>
<td>Exhibitor Set-up</td>
<td>Heritage EF</td>
</tr>
<tr>
<td>2:00 p.m. - 6:30 p.m.</td>
<td>Conference Registration Open</td>
<td>Heritage Ballroom Foyer</td>
</tr>
<tr>
<td>5:30 p.m. - 7:00 p.m.</td>
<td>Welcome Reception with Exhibitors</td>
<td>Heritage EF</td>
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<tr>
<td>TUESDAY, JUNE 5, 2018</td>
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<tr>
<td>7:00 a.m. - 5:30 p.m.</td>
<td>Registration Open</td>
<td>Heritage Ballroom Foyer</td>
</tr>
<tr>
<td>7:30 a.m. - 8:30 a.m.</td>
<td>Continental Breakfast</td>
<td>Heritage Ballroom Foyer</td>
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<tr>
<td>9:00 a.m. - 10:00 a.m.</td>
<td>Opening Plenary Session</td>
<td>Heritage ABC</td>
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<tr>
<td>10:00 a.m. - 10:30 a.m.</td>
<td>Refreshment Break with Exhibitors</td>
<td>Heritage EF</td>
</tr>
<tr>
<td>10:30 a.m. - 12:30 p.m.</td>
<td>Technical Programming</td>
<td>Heritage ABC, D</td>
</tr>
<tr>
<td>12:30 p.m. - 2:00 p.m.</td>
<td>Networking Lunch with Exhibitors</td>
<td>Heritage EF</td>
</tr>
<tr>
<td>12:30 p.m. - 2:00 p.m.</td>
<td>HTS T&amp;P Committee Strategic Planning Meeting</td>
<td>Wadsworth &amp; Croft</td>
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<tr>
<td>2:00 p.m. - 6:00 p.m.</td>
<td>Technical Programming</td>
<td>Heritage ABC, D</td>
</tr>
<tr>
<td>3:30 p.m. - 4:00 p.m.</td>
<td>Refreshment Break with Exhibitors</td>
<td>Heritage EF</td>
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<tr>
<td>WEDNESDAY, JUNE 6, 2018</td>
<td>Attendees on Own for the Evening</td>
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<td>7:00 a.m. - 5:30 p.m.</td>
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<td>Heritage Ballroom Foyer</td>
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<tr>
<td>7:30 a.m. - 8:30 a.m.</td>
<td>Continental Breakfast</td>
<td>Heritage Ballroom Foyer</td>
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<tr>
<td>9:00 a.m. - 10:00 a.m.</td>
<td>Plenary Session</td>
<td>Heritage ABC</td>
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<tr>
<td>10:00 a.m. - 10:30 a.m.</td>
<td>Refreshment Break with Exhibitors</td>
<td>Heritage EF</td>
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<tr>
<td>10:30 a.m. - 12:30 p.m.</td>
<td>Technical Programming</td>
<td>Heritage ABC, D</td>
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<tr>
<td>10:30 a.m. - 5:30 p.m.</td>
<td>Residual Stress Workshop</td>
<td>Wadsworth &amp; Croft</td>
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<tr>
<td>12:30 p.m. - 2:00 p.m.</td>
<td>Networking Lunch with Exhibitors</td>
<td>Heritage EF</td>
</tr>
<tr>
<td>2:00 p.m. - 4:00 p.m.</td>
<td>Exhibitor Tear-Down</td>
<td>Heritage EF</td>
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<tr>
<td>2:00 p.m. - 5:30 p.m.</td>
<td>Technical Programming</td>
<td>Heritage ABC, D</td>
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<tr>
<td>6:30 p.m. - 8:30 p.m.</td>
<td>Networking Event / Carolina BBQ (separate registration required)</td>
<td>Azalea Terrace</td>
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<tr>
<td>THURSDAY, JUNE 7, 2018</td>
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<tr>
<td>7:00 a.m. - 12:00 p.m.</td>
<td>Registration Open</td>
<td>Heritage Ballroom Foyer</td>
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<tr>
<td>7:30 a.m. - 8:30 a.m.</td>
<td>Continental Breakfast</td>
<td>Heritage Ballroom Foyer</td>
</tr>
<tr>
<td>8:30 a.m. - 9:30 a.m.</td>
<td>Plenary Session</td>
<td>Heritage ABC</td>
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<tr>
<td>9:30 a.m. - 10:00 a.m.</td>
<td>Refreshment Break</td>
<td>Heritage Ballroom Foyer</td>
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<tr>
<td>10:00 a.m. - 12:30 p.m.</td>
<td>Technical Programming</td>
<td>Heritage ABC, D</td>
</tr>
<tr>
<td>12:30 p.m.</td>
<td>Conference Concludes</td>
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as of 5/15/18 | Program is tentative and subject to change
From HTPro September 2017 Issue:

REVOLUTION — NOT EVOLUTION — NECESSARY TO ADVANCE INDUCTION HEAT TREATING

Authors: Gary Doyan, Valery Rudnev, FASM, Collin Russell and John Maher, Inductoheat, Inc.

2018 INTERNATIONAL FEDERATION FOR HEAT TREATMENT AND SURFACE ENGINEERING FELLOWS

The International Federation for Heat Treatment and Surface Engineering (IFHTSE) is a not-for-profit body founded in Switzerland 16th May, 1971.

The Mission of IFHTSE is:
Coordinate—Acting as a multinational organization consisting of individual heat treating and surface engineering societies, to coordinate and plan global heat treating events and conferences.
Educate—Through conferences and other heat treating and surface engineering events. Foster knowledge transfer globally, either formally or informally through an interdisciplinary approach.
Cooperate—Encouraging participation between heat treating and surface engineering societies across national borders.
Recognize—Placing emphasis on recognizing young engineers, and scientists in industry or academia. Foster recognition across national borders in all aspects of heat treating and surface engineering.

IFHTSE Fellowship recognizes individuals who have made outstanding, globally recognized and significant contributions to the development of heat treatment or surface engineering. The citations are characterized by brevity, since these honored individuals are well known globally in the field. Fellow presentation plaques are kindly provided by Houghton International.

The following persons have been nominated for IFHTSE Fellow:

PROFESSOR RAFAEL COLÁS

For his dedication to educating the next generation of heat treating and surface engineering students; For his investigations of aluminum casting performance, especially for automotive applications; and for his seminal work on high temperature oxidation of alloys.

Rafael Colás earned his B.Eng. (Met.) in 1978 from Universidad Autónoma Metropolitana, in Mexico City, and his M.Met. and Ph.D. from University of Sheffield, England, in 1980 and 1984 respectively. He held the post of Lecturer at the Faculty of Engineering of Universidad Nacional Autónoma de México from 1984 to 1987. He was appointed Research Manager at Hylsa, S.A. de C.V., a major Mexican integrated steelworks in Monterrey from 1987 to 1992. In July 1992, he was appointed Professor at the Faculty of Mechanical and Electrical Engineering of Universidad Autónoma de Nuevo León. He had carried out research stays in universities of Colombia, Chile, England and Canada. He spent a sabbatical leave as Professor at University of Ghent, Belgium during 2001–02. He directed the Centre for Innovation, Research and Development in Engineering and Technology of Universidad Autónoma de Nuevo León for the 2010-13. He was President of the Monterrey Chapter of the Mexican Foundrymen’s Society for the 2002-03 and of the Mexican Chapter of the Association for Iron and Steel Technology from 2014–16.

He was distinguished as one of the Best Students in Mexico (Los Mejores Estudiantes de México) in 1978, and as Distinguished Lecturer at the 1995 meeting of the Materials Research Centre of Ontario, Canada. He
has received the award TECNOS, organized by the Government of the State of Nuevo León in 1994, 1996, 1998 and 2000. He was admitted to the Mexican Academy of Engineering in 1985, and to the Mexican Academy of Sciences in 2000. He was recognized as Fellow of ASM International in 2004.

He is author of more than 180 papers published in journals indexed within the Journal Citation Report and of more than 370 papers published in nonindexed journals, and in the proceedings of national and international events. He has supervised the research work of more than 120 students that have obtained their under-and postgraduate degrees. He has been invited as external examiner of Ph.D. thesis of students of American, Australian, Belgian, Canadian, Chilean, English and Italian universities.

**DR. VALERY I. RUDNEV**

*For his preeminence in induction heat treating, and modeling of the induction heat treating process.*

Dr. Valery Rudnev is the Director of Science & Technology at Inductoheat, Inc., an Inductotherm Group Company. He received his M.S. degree in Electrical Engineering (concentration-induction heating), Department of Electrical Engineering, Samara State Technical University, Samara, Russia, 1977. He earned his Ph.D. in Electro-Thermal Technology, Department of El. Eng. and Automation, St. Petersburg State Electrical Engineering University, St. Petersburg, Russia, 1986. He held positions of associate and Assistant Professor at St. Petersburg Electrical Engineering University, St. Petersburg, Russia and Samara State Technical University, Samara, Russia. He has been a visiting Professor at the Colorado School of Mines.

Dr. Rudnev has more than 30 years of experience and is known within the American Society for Materials (ASM International) and among induction heating professionals as “Professor Induction.” In 2006, Dr. Rudnev was elected as a Fellow of ASM International in recognition of his distinguished contributions to the field of materials science and materials engineering. He was a Chairman of the Technical Committee of Forging Industry Association (FIA) of North America (2013-2016). Dr. Rudnev authored and co-authored numerous chapters and articles for nine handbooks devoted to various aspects of induction heating, heat treating, material science, computer modeling and innovative process development. He has been a member of Editorial Boards and Scientific Advisory Committees of ASM, Forging Industry Association of North America (FIA), and the Association of Iron and Steel Technology (AIST).

He is the author of over 200 papers and books, published in English, Russian, and Chinese (as well as other languages). He has also been awarded over 100 patents or pending patents, in the US, China, Russia, Japan, and European Union.

**DR. RICHARD D. SISSON**

*For his recognized leadership at the Center for Heat Treating Excellence, and his continued passion for educating the next generation of heat treating engineers and researchers.*

Richard D. Sisson, Jr. is currently the George F. Fuller Professor, the Director of Manufacturing and Materials Engineering and the Director of the Center for Heat Treating Excellence at Worcester Polytechnic Institute. Prof. Sisson recently was the Dean of Graduate Studies for the five years which ended in June 2014. Professor Sisson has been with Worcester Polytechnic Institute for a total of 39 years. In addition, he has taught at Virginia Polytechnic Institute and has been a Research Metallurgist with Savannah River National Laboratory and a Staff Engineer with Exxon Chemical Company. Professor Sisson received his B.S. Metallurgical Engineering from Virginia Polytechnic Institute in 1969, his M.S. in 1971, and Ph.D. in 1975 in Materials Science and Engineering from Purdue University.

Professor Sisson’s main research interest is the application of the fundamentals of diffusion kinetics, modeling and thermodynamics to the solution of materials problems. He is currently working on the heat treatment of steels and aluminum alloys as well as additive manufacturing of ceramics and metals. He has also worked on the effects of deposition process parameters on the microstructure and cyclic thermal stability of partially stabilized zirconia thermal barrier coating and the green processing ceramics. His research work has resulted in over 250 publications and over 250 technical presentations.

In addition, Professor Sisson has been recognized by Worcester Polytechnic Institute for his excellent teaching and research with the inaugural WPI, Chairman’s Exemplary Faculty Prize 2007. He has also received the WPI Trustees Award for Outstanding Research and Creative Scholarship in 2017 and the WPI Trustees Award for outstanding teaching in 1987. In 2014, he was chosen as the Outstanding Materials Engineer (OSME) award winners as a Purdue Alumnus for his work in applying fundamental science in transport phenomena, phase transformations and phase equilibria as well as for his leadership role as Dean of Graduate Studies at WPI. He has also been recognized with the Virginia Tech College of Engineering, Academy of Engineering Excellence 2006. ASM honored Prof. Sisson with the “Distinguished Life Membership” award in 2013. He has advised more than 20 Ph.D. students, 10 Post-Doctoral Fellows and over 100 M.S. students. Professor Sisson is a Fellow of ASM International.
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High Temperature Concept™
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Sarasota, Florida 34236, U.S.A.
www.high-temperature-concept.com
joerg.demmel@high-temperature-concept.com
KEYNOTE PRESENTATIONS

TUESDAY, JUNE 5, 2018
9:00 a.m.
JOE EPPERSON, FASM
NTSB AND ITS MATERIALS LABORATORY
Recently Retired Senior Metallurgist, NTSB

WEDNESDAY, JUNE 6, 2018
9:00 a.m.
DR. RAFAEL COLÁS
METALLURGICAL ASPECTS OF ALUMINUM POWER DRIVEN COMPONENTS
Professor and Metallurgist Engineer, Universidad Autónoma de Nuevo León

THURSDAY, JUNE 7, 2018
8:30 a.m.
DR. RICHARD D. SISSON, FASM
CHALLENGES AND OPPORTUNITIES FOR THE HEAT TREATING COMMUNITY—THREATS, RISKS AND BENEFITS
Director of Manufacturing and Materials Engineering, Worcester Polytechnic Institute

HEAT TREAT MEXICO 18
Fiesta Americana
Queretaro, Mexico
Advanced Thermal Processing Technology Conference & Expo

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September 25-28, 2018

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RESIDUAL STRESS WORKSHOP

Wednesday, June 6, 2018
9:00 a.m. - 5:00 p.m.

This special workshop will review the current state-of-the-art in residual stress measurement, prediction, control and incorporation into product design. Workshop will collect information on current gaps relative to designing products and establishing product definitions that include bulk residual stress as a component attribute. Concepts for possible industry standards will be proposed to support enhanced product capabilities.

9:00 a.m. – 10:00 a.m.

TPIM Conference Keynote Presentation
(conference and workshop attendees)

Metallurgical Aspects of Aluminum Power Drive Components
Dr. Rafael Colás Ortiz, FASM Professor and Metallurgist Engineer Faculty of Mechanical and Electrical Engineering, Universidad Autónoma de Nuevo León

10:30 a.m. – 12:30 p.m.

Overview of Residual Stress in Industry Applications, Including Modeling and Measurement
David Selfridge, Arconic

Overview of Residual Stress Measurement in Industry Applications
Mike Hill and Adrian DeWald, Hill Engineering

Application of Residual Stress in Design and Product Performance
James Sobotka, SwRI

Representation and Specification of Residual Stress in Product Design
Greg Dubay, Caterpillar

12:30 p.m. – 2:00 p.m.

Lunch with TPIM Conference Attendees and Exhibitors

2:00 p.m.

Workshop

Introduction to Workshop Goals
Iuliana Cernatescu, Pratt & Whitney State of the Art in R/S Specification and Application in Product Design

Breakout Sessions

Panel Session to Review Topic Discussions

5:00 p.m.- WRAP-UP

6:30 p.m. – 8:30 p.m.

Networking Event/BBQ
(separate ticket purchase is required)

WELCOME RECEPTION WITH EXHIBITORS

Monday, June 4, 2018
Spartanburg Marriott
5:30 p.m. – 7:00 p.m.
Included with Registration

Relax, meet with exhibitors and enjoy light appetizers and drinks during this year’s Welcome Reception

CAROLINA BBQ NETWORKING EVENT

Wednesday, June 6, 2018
6:30 p.m. – 8:30 p.m.
Tickets — $65.00 each (pre-registration required)
Wednesday Presentation:

*CFD Modeling of Short Time Dilatometry Testing of High Carbon Steels*

Tabletop #25
12190 Hubbard St
Livonia, MI 48150
734-525-0300
www.airflowsciences.com
TECHNICAL PROGRAM

TUESDAY, JUNE 5, 2018

KEYNOTE SESSION I:
NTSB AND ITS MATERIALS LABORATORY
Joe Epperson, FASM
9:00 a.m.–10:00 a.m.
Meeting Room: Heritage ABC

QUENCHING AND QUENCHANTS I
10:30 a.m.–12:30 p.m.
Meeting Room: Heritage D

SESSION CHAIR: Mr. David A Guisbert
QA Metallurgical Services LLC
Niles, MI USA

10:30 a.m.
Understanding the Cooling Curve Test: Dr. D. Scott MacKenzie, Houghton International Inc., Valley Forge, PA

11:00 a.m.
On the Nature-Inspired Algorithms Applied to Characterize Heat Transfer Coefficients: Dr. Imre Felde, Dr. Sándor Szénási and Mr. Zoltan Fried, University of Obuda, Budapest, Hungary

11:30 a.m.
Introduction of Modified Fluid for Heat Treatment of Automotive Components: Dr. Octavio Covarrubias and Mr. Jose M Navarro, Facultad de Ingeniería Mecánica y Electrónica, Universidad Autónoma de Nuevo León, San Nicolás, Mexico

12:00 p.m.
Using Smoothed-Particle Hydrodynamics Method to Model Air Quenching Process as an Alternative to Finite Volume Based CFD Method: Dr. James Jan1 and Dr. David Greif2, 1Ford Motor Company, Livonia, MI, 2AVL-AST d.o.o., Maribor, Slovenia

THERMAL PROCESSING—PHASE TRANSFORMATIONS, MICROSTRUCTURE/PROPERTY RELATIONSHIPS I
10:30 a.m.–12:30 p.m.
Meeting Room: Heritage ABC

SESSION CHAIRS:
Prof. Rafael Colas
Universidad Autónoma de Nuevo León
San Nicolás de los Garza, Mexico

Mr. Andrew L. Banka
Airflow Sciences Corporation
Livonia, MI USA

10:30 a.m.
Effect of the Heat Treatment on the Microstructure and Mechanical Properties of Medium-Mn-Steels: Prof. Reinhold S. E. Schneider1, Dr. Katharina Steineder2, Dr. Daniel Krizan2 and Prof. Christof Sommitsch3, 1Univ. of Appl. Sciences Upper Austria, Wels, Austria, 2Voestalpine Stahl GmbH, Linz, Austria, 3Materials Science and Welding, Graz University of Technology, Graz, Austria

11:00 a.m.
Austenite Grain Nucleation and Growth After Re-Austenitizing Pre-Quenched 0.56% C Steels: Prof. Robert Cryderman, Metallurgical & Materials Engineering, Advanced Steel Processing & Products Research Center Colorado School of Mines, Golden, CO

11:30 a.m.
Effect of Spheroidised Annealing Before Cold Forging on the Behavior of Austenite Grain Coarsening during Carburizing: Mr. Yuta Imanami, Mr. Takashi Iwamoto and Mr. Kimihiro Nishimura, Steel Research Laboratory, JFE Steel Corporation, Kurashiki, Japan

12:00 p.m.
Creation of Nanostructured Austempered Ductile Iron by a Novel Process: Prof. Susil K. Putatunda, Prof. Susil K. Putatunda and Mrs. Saranya Panneerselvam, Chemical Engineering and Materials Science, Wayne State University, Detroit, MI
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SURFACE HARDENING (PLASMA, INDUCTION, LASER, ELECTRON BEAM)
2:00 p.m.–5:30 p.m.
Meeting Room: Heritage D

SESSION CHAIRS:
Prof. Bernard Nacke
Leibniz University Hannover
Hannover, Germany

Mr. Robert C. Goldstein
Fluxtrol Incorporated
Auburn Hills, MI USA

2:00 p.m.
Induction Hardening of Gears—Physical Subtleties and Practical Solutions: Mr. Collin Russell, Research & Development, Inductoheat Inc., Madison Heights, MI

2:30 p.m.
Fully Non-Linear Modelling of Induction Heating of Carbon Steel Using Open Source Simulation Tools: Dr. Vadims Geza and Dr. Mihails Scepanski, CENOS, Riga, Latvia

3:00 p.m.
Silicon Enhancement of the Compound Layer for Tribological Application of Nitrided Hot-Work Steel: Dr. Edward Rolinski, Dr. Eng. Dr. Habil1, Mikel S. Woods2, Jacob McCann1 and Jeff Machcinski2, 1Metallurgy, Advanced Heat Treat Corp., Monroe, MI, 2Advanced Heat Treat Corp., Waterloo, IA

3:30 p.m. Refreshment Break with Exhibitors

4:00 p.m.
Laser Surface Hardening of Industrial Parts via Predictive Modeling: Mr. Neil Bailey1 and Prof. Yung Shin2, 1Mechanical Engineering, Purdue University, W. Lafayette, IN, 2Mechanical Engineering, Purdue University, West Lafayette, IN

4:30 p.m.
Single-Shot Induction Hardening—Improving Product Quality and Inductor Life: Mr. Collin Russell, Research & Development, Inductoheat Inc., Madison Heights, MI

5:00 p.m.
Information Technology and IIoT in Induction Heat Treatments Installations: Prof. Fabrizio Dughiero and Prof. Michele Forzan, Industrial Engineering, University of Padova, Padova, Italy

THERMOMECHANICAL THERMAL PROCESSING (NITRIDING, CARBURIZING) I
2:00 p.m.–6:00 p.m.
Meeting Room: Heritage ABC

SESSION CHAIR:
Prof. Richard D Sisson
Worcester Polytechnic Institute
Worcester, MA USA

2:00 p.m.
Low Temperature Surface Hardening of Stainless Steels in Automotive Applications: Mr. Ulli Oberste-Lehn and Dr. Andreas Karl, Bodycote, Landsberg, Germany

2:30 p.m.

3:00 p.m.
Alloying and Microstructure Design for Nitriding Steels: Mr. Jonah Klemm-Toole, Prof. Kip O. Findley and Prof. Robert Cryderman, Metallurgical & Materials Engineering, Advanced Steel Processing & Products Research Center Colorado School of Mines, Golden, CO

3:30 p.m. Refreshment Break with Exhibitors

4:00 p.m.
Ferritic Nitrocarburizing — Demystifying the Process: Mr. William J Bernard III, Surface Combustion, Maumee, OH

4:30 p.m.
Semi-Continuous Case Hardening by Low-Pressure Carburizing and High-Pressure Gas Quench: Mr. Tom Hart, SECO/VACUUM TECHNOLOGIES, LLC, Meadville, PA

5:00 p.m.
The Use of Low-Pressure Carburizing and High-Pressure Gas Quenching for In-Line Heat Treat Processing: Mr. Dennis Beauchesne, ECM-USA, Inc., Pleasant Prairie, WI

5:30 p.m.
Characterization of Plasma Nitriding Process and Development of A Nitriding Simulation Program: Dr. Wei SHI, Mr. Yi Ding and Dr. Imre Felde, 1Department of Mechanical Engineering, Tsinghua University, Beijing, China, 2University of Obuda, Budapest, Hungary
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KEYNOTE SESSION II—METALLURGICAL ASPECTS OF ALUMINUM POWER DRIVEN COMPONENTS
Prof. Rafael Colas
9:00 a.m.-10:00 a.m.
Meeting Room: Heritage ABC

ADVANCES IN THERMAL PROCESSING
10:30 a.m.-12:00 p.m.
Meeting Room: Heritage ABC

SESSION CHAIRS:
Mr. Robert C. Goldstein
Fluxtrol Incorporated
Auburn Hills, MI USA

Prof. Fabrizio Dughiero
University of Padua
Padova, Italy

10:30 a.m.
Potentials of Induction Heating for Hot Metal Forming of Car Body Parts: Prof. Bernard Nacke, Institute of Electrotechnology, Leibniz University Hannover, Hannover, Germany

11:00 a.m.
Digital Quality Control of Thermochemical Processes — Industry 4.0: Dr. Volker Heuer, AVW-FE, ALD Vacuum technologies GmbH, Hanau, Germany

11:30 a.m.
Oxide Fiber Ceramic Charge Carriers for Product and Process Quality Improvement: Dr. Mathias Kunz, WPX Faserkeramik GmbH, Troisdorf, Germany

QUENCHING AND QUENCHANTS II
10:30 a.m.–12:30 p.m.
Meeting Room: Heritage D

SESSION CHAIR:
Dr. D. Scott MacKenzie
Houghton International Inc.
Valley Forge, PA USA

10:30 a.m.
A New Approach to Study Vapor Transport in Water Boiling Process and Its Application to Estimate Neighboring Effect in Cluster Quenching Environment: Dr. James Jan1 and Mr. Shanmugasundaram Chadrakesan2, 1Ford Motor Company, Livonia, MI, 2AVL Powertrain Engineering, Inc., Plymouth, MI

11:00 a.m.

11:30 a.m.
Streamlining Atmosphere Heat Treatment—Best Practices for Minimizing Distortion and Reducing Manufacturing Costs: Mr. Janusz Kowalewski, Ipsen USA, Cherry Valley, IL

12:00 p.m.
New CFRC Info and Performance in Oil Quenching: Mr. Jim McAllister, MBA, Sales, SGL Group - The Carbon Company, Saint Marys, PA

QUENCHING AND QUENCHANTS III
2:00 p.m.–5:30 p.m.
Meeting Room: Heritage D

SESSION CHAIR:
Mr. Dennis Beauchesne
ECM-USA, Inc.
Pleasant Prairie, WI USA

2:00 p.m.
Efficient Prediction of Heat Transfer during Quenching based on a Modified Reynolds-Colburn Analogy: Mr. Marco A. González-Melo and Prof. Francisco A. Acosta-González, Metallurgical Engineering, Centro de Investigación y de Estudios Avanzados del I.P.N. - Unidad Saltillo, Ramos Arizpe, Mexico

*Fluxtrol Student Award Nominee
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2:30 p.m.
Methods of Water Removal for Your Quench Oils: Mr. Jimmy Pfaffenberger¹ and Dr. D. Scott MacKenzie², ¹CC Jensen, Newnan, GA, ²Houghton International Inc., Valley Forge, PA

3:00 p.m.
On the Characterization of Heat Transfer Rate in Various Boiling Regimes Using Quenchometers and Its Application for Quenching Process Simulations: Dr. James Jan¹ and Dr. D. Scott MacKenzie², ¹Ford Motor Company, Livonia, MI, ²Houghton International Inc., Valley Forge, PA

3:30 p.m. Refreshment Break

4:00 p.m.
How Proper Care of Quench Oil Can Lead to Consistent Part Quality and Program Cost Savings: Mr. Eddie Rowland¹ and Dr. D. Scott MacKenzie², ¹CC Jensen, Newnan, GA, ²Houghton International Inc., Valley Forge, PA

4:30 p.m.
Understanding Your Quenchant Report: Ms. Gloria Graham¹ and Dr. D. Scott MacKenzie², ¹Houghton International, Valley Forge, PA, ²Houghton International Inc., Valley Forge, PA

5:00 p.m.
Beware of Incomplete Steel Specifications: Mr. David A Guisbert, QA Metallurgical Services LLC, Niles, MI

TECHNICAL PROGRAM

THERMAL PROCESSING
PHASE TRANSFORMATIONS,
MICROSTRUCTURE/PROPERTY RELATIONSHIPS II

2:00 p.m.–5:30 p.m.
Meeting Room: Heritage ABC

SESSION CHAIR:
Dr. Lesley D. Frame
University Of Connecticut
Storrs, CT USA

2:00 p.m.
Forming of Chromium-Nickel Surface Alloyed Layers in Steels by Methods of Thermo-Chemical Treatment: Prof. L.G. Petrova, Dr. P.E. Demin and Dr. V.A. Aleksandrov, Moscow Automobile and Road Construction State Technical University (MADI), Moscow, Russia

2:30 p.m.
Finite Element Analysis of Microstructure Evolution of Materials Going through Thermo-Mechanical Deformation Processes: Prof. Yung Shin, Mechanical Engineering, Purdue University, West Lafayette, IN
*Fluxtrol Student Award Nominee

3:00 p.m.
Influence of Heating Rates on Temperature Gradients in Short Time Dilatometry Testing: Mr. Tareq Eddir¹, Ethan Buchner², Prof. Robert Cryderman¹ and Mr. Robert C. Goldstein¹ and Dr. Emmanuel De Moor², ¹Engineering, Fluxtrol Inc., Auburn Hills, MI, ²Colorado School of Mines, Golden, CO, ³Fluxtrol Incorporated, Auburn Hills, MI
*Fluxtrol Student Award Nominee

3:30 p.m. Refreshment Break

4:00 p.m.
Modeling of Short Time Dilatometry Testing of High Carbon Steels: Mr. Andrew L. Banka¹, Mr. Tareq Eddir², Mr. Robert C. Goldstein², Ethan Buchner³, Prof. Robert Cryderman¹ and Mr. Andrew Senita¹, ¹Airflow Sciences Corporation, Livonia, MI, ²Fluxtrol Incorporated, Auburn Hills, MI, ³Metallurgical & Materials Engineering, Advanced Steel Processing & Products Research Center, Colorado School of Mines, Golden, CO
*Fluxtrol Student Award Nominee

4:30 p.m.
Mechanical Properties of 4340 Steel Subjected to Short-Time Tempering within the Tempered Martensite Embrittlement Regime: Ms. Virginia K. Judge, Dr. John G. Speer and Prof. Amy J. Clarke, George S. Ansell Dept. of Metallurgical and Materials Engineering, Colorado School of Mines, Golden, CO
*Fluxtrol Student Award Nominee

5:00 p.m.
Mechanical Properties of Cast Aluminum Alloys in a Wide Temperature Range: Prof. Rafael Colas¹, Alma G. Esmeralda¹, Andrés Rodriguez² and Dr. Jose Talamantes-Silva³, ¹Universidad Autónoma de Nuevo León, San Nicolás de los Garza, Mexico, ²Research and Development, Nemak, S.A. de C.V., Garcia, Mexico
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KEYNOTE SESSION III:
CHALLENGES AND OPPORTUNITIES FOR THE HEAT TREATING COMMUNITY:
THREATS, RISKS AND BENEFITS
Dr. Richard Sisson
8:30 a.m. – 9:30 a.m.
Meeting Room: Heritage ABC

ADDITIVE MANUFACTURING
THERMAL PROCESSING
10:00 a.m.–12:30 p.m.
Meeting Room: Heritage D

SESSION CHAIR:
Mr. Richard A Guisbert
QA Metallurgical Services
LLC Niles, MI USA

10:00 a.m.
Heat Treatment of Additively Manufactured Parts:
Prof. Richard D Sisson, Prof. Mei Yang, Ms. Jin Guo and Mr. Haixuan Yu, Center for Heat Treating Excellence, Worcester Polytechnic Institute, Worcester, MA

10:30 a.m.
Isolating Specific Microstructure Effects on Observed Enhanced Mechanical Strength of Additively Manufactured 304L Stainless Steel: Dr. Reenu Pokhare1, Dr. Donald W. Brown1, Dr. David P. Adams1 and Dr. Elliott P. Specht2, 1Los Alamos National Laboratory, Los Alamos, NM, 2Sandia National Laboratories, Albuquerque, NM

11:00 a.m.
Investigation into Improving the Properties of Titanium Additive Manufactured Components via Post Build Thermal Processes: Mr. Ronald Adams, Bodycote, Frisco, TX

11:30 a.m.
Laser Cladding of Wear and Corrosion Resistant Materials with A High Power Direct Diode Laser: Prof. Yung Shin, Mechanical Engineering, Purdue University, West Lafayette, IN

12:00 p.m.
Thermomechanical Processing for Creating Bi-Metal Bushing Bearings: Mr. Robert C. Goldstein1, Prof. Bernd-Arno Behrens2, Mr. Deniz Duran3 and Mrs. Anna Chugreeva4, 1Fluxtrol Incorporated, Auburn Hills, MI, 2Institute of Forming Technology and Machines, Garbsen, Germany

THERMAL PROCESSING—
PHASE TRANSFORMATIONS,
MICROSTRUCTURE/PROPERTY RELATIONSHIPS III
10:00 a.m.–12:30 p.m.
Meeting Room: Wadsworth & Croft

SESSION CHAIR:
Dr. Lesley D. Frame
University Of Connecticut
Storrs, CT USA

10:00 a.m.
Thermomechanical Processing of Friction Welded Steel-Aluminum Billets to Improve Joining Zone Properties: Mr. Robert C. Goldstein1, Mr. David A Guisbert2, Prof. Bernd-Arno Behrens3 and Mr. Deniz Duran4, 1Fluxtrol Incorporated, Auburn Hills, MI, 2QA Metallurgical Services LLC, Niles, MI, 3Institute of Forming Technology and Machines, Garbsen, Germany

10:30 a.m.
Application of Data Analytics Methods for Steel Processing—A Look at Steel Compositional Variability: Ms. Sulagna Dash, Mr. Aditya Ozarkar, Mr. Shree Bubesh Kumaar Sridhar and Dr. Lesley D. Frame, University of Bridgeport, Bridgeport, CT

11:00 a.m.
Compositional Variability in Recycled Steel Destined for Thermal Processing—A Supply Chain Approach: Mr. Aditya Ozarkar, Mr. Shree Bubesh Kumaar Sridhar, Ms. Sulagna Dash and Dr. Lesley D. Frame, University of Bridgeport, Bridgeport, CT

11:30 a.m.
Effects of Compositional Variability Due to the Presence of Residual Elements on Steel Processing and Properties: Mr. Shree Bubesh Kumaar Sridhar, Mr. Aditya Ozarkar and Dr. Lesley D. Frame, University of Bridgeport, Bridgeport, CT

12:00 a.m.
Simulated Fatigue Sample for Bending Fatigue Test of Gear: Dr. Mohammed Maniruzzaman and Mr.
TECHNICAL PROGRAM

Michael Pershing, Innovation & Emerging Technology, Caterpillar Inc, Mossvile, IL

THERMAL PROCESSING IN MOTION
THERMAL PROCESSING (NITRIDING, CARBURIZING) II
10:00 a.m.–12:30 p.m.
Meeting Room: Heritage ABC

SESSION CHAIR:
Mr. Benjamin T. Bernard
Surface Combustion, Inc.
Maumee, OH USA

10:00 a.m.
On-Site Hydrogen Generation Simplifies Surfaces Coatings Infrastructure: Mr. David Wolff* and Dr. David Cook†, Proton OnSite, Wallingford, CT, Flame-Spray Industries, Inc., Port Washington, NY

10:30 a.m.
Low Pressure Carburizing Cycle Determination for High Alloy Steels: Dr. B. Lynn Ferguson, Dr. Zhichao (Charlie) Li, Tianyu Yu and Mr. Justin Sims, DANTE Solutions, Inc., Cleveland, OH

11:00 a.m.

11:30 a.m.
Troubleshooting of Heat Treatment Furnace Atmosphere Problems and New Technologies to Avoid These: Mr. Akin Malas, Linde North America LLC, Murray Hill, NJ

12:00 p.m.
Possible Use of Anomalous Mass Transfer in Thermomechanical Processing: Dr. Roman Mezhvinsky, Mason, OH

POSTERS
Nanomaterial Ink Coating for Functional 3D-Printed Parts: Alex Strasser, Texas A&M University, College Station, TX
*Fluxtrol Student Award Nominee
EXHIBIT DATES AND TIMES

Location: Heritage EF

Monday, June 4
Welcome Reception .......................... 5:30 p.m. – 7:00 p.m.

Tuesday, June 5
Refreshment Break .......................... 10:00 a.m. – 10:30 a.m.
Lunch ........................................... 12:30 p.m. – 2:00 p.m.
Refreshment Break .......................... 3:30 p.m. – 4:00 p.m.

Wednesday, June 6
Refreshment Break .......................... 10:00 a.m. – 10:30 a.m.
Lunch ........................................... 12:30 p.m. – 2:00 p.m.

EXHIBITOR LIST

*as of 5/21/2018

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IPSEN
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Ipsen designs and manufactures industrial atmosphere and vacuum heat-treating systems, supervisory controls systems and predictive maintenance software platforms for multiple industries, including Aerospace, Automotive, Commercial Heat Treating, Energy and Medical. With 70 years of thermal processing experience, they continue to provide expert-driven solutions that strengthen heat treatment throughout the world.
www.ipsenUSA.com

MAGER SCIENTIFIC
TABLETOP #22
Mager provides cutting edge automated sample preparation equipment solutions backed by technical specialists with the expertise and experience to optimize your metallographic laboratory. We are the exclusive U.S. distributor for ATN metallographic equipment and Qness hardness testers which are complemented by Nikon microscopes, digital cameras and Clemex image analysis software.
www.magersci.com

NEL HYDROGEN
TABLETOP #4
Nel Hydrogen a global, dedicated hydrogen company, delivering optimal solutions to produce, store & distribute hydrogen. Our patented Alkaline and Proton® PEM electrolysis systems coupled with uncompromising attention to excellence and quality enable us to provide solutions that meet global hydrogen requirements for thermal processing applications.
www.nelhydrogen.com

PROTO
TABLETOP #30
PROTO has the most comprehensive line of residual stress x-ray diffraction measurement systems. Designed to ensure accurate results on complex part geometries and difficult to measure materials. Our team of application scientists and engineers will ensure that you get the best system and support for all of your applications.
www.protoxrd.com

RÜBIG GMBH & CO KG
TABLETOP #2
RÜBIG Industrial Furnaces is a globally active producer of customized heat treatment plants (plasma/gas nitriding, plasma coating). The Know-how reflected in the systems has been gained in the in-house job shop. With the brands MICROPULS® Everest, MICROPULS® Diamond Xtended, MICROPULS® Pro-

coat and GASCON K2, RÜBIG has reached new heights in nitriding and coating.
www.rubig.com

SECO/VACUUM TECHNOLOGIES
TABLETOP #17
SECO/VACUUM, the North American Furnace Company for SECO/’WARWICK, is a Leader in Surface Engineering, with industry leading technology in both Gas Nitriding and Low Pressure Carburizing. As one of the largest furnace companies in the world, SECO/VACUUM has the most advanced solutions in vacuum furnaces, carburizing and gas nitriding.
www.secowarwick.com

SGL CARBON
TABLETOP #16
SGL Carbon is one of the world’s leading manufacturers of carbon-based products. Our comprehensive portfolio ranges from carbon and graphite products to carbon fibers and composites. We focus on creating innovative solutions and adding value for our customers across a multitude of industries.
www.sglgroup.com

SOLAR ATMOSPHERES
TABLETOP #28
Solar Atmospheres specializes in vacuum heat treating, brazing, and carburizing services. Solar serves over 18 metal working industries including aerospace, medical, power generation, and automotive. Solar produces bright scale-free parts with minimal distortion with over 60 vacuum furnaces located in Eastern and Western Pennsylvania, California, and South Carolina.
www.solaratm.com

STRESSTECH
TABLETOP #14
Stresstech is headquartered in Finland and has offices in Germany, the United States, and India, as well as sales and service representatives around the world. For more than 30 years, Stresstech has been providing non-destructive testing solutions for process control and quality inspection. The inspection equipment serves the automotive, aerospace and other manufacturing industries as well as universities and research institutes.
www.stresstech.com

SURFACE COMBUSTION
TABLETOP #20
Established in 1915, Surface® provides customers rugged, reliable thermal processing equipment. Our strength lies in the breadth of our product portfolio, our unparalleled process knowledge, and our commitment to customer service. From our standard atmosphere and vacuum furnace designs, to custom engineered thermal process solutions, to quick, responsive aftermarket support, let us show you the Value of Surface.
www.surfacecombustion.com
VERDER SCIENTIFIC sets standards in high-tech equipment for quality control, research and development of solid matter. The well-known Verder Scientific brands have served research institutions, analytical laboratories as well as manufacturing companies in quality control and process applications for many decades with ever more sophisticated and reliable products which offer the solution to their individual task.
THERMAL SYSTEMS AND ENGINEERING
TABLETOP #31
For over 30 years, Thermal Systems and Engineering (TSE) has been a market leader in manufacturing Energy Efficient Heat Treatment Furnaces as per CQI Norms/NADCAP/AMS2750 Standards, with ISO 9001:2015, UKAS Management System and GIC. Our strength lies in our optimized manufacturing techniques that reduce the cost of manufacturing while maintaining superior quality.
www.thermalsystems.in

THERMCRAFT, INC.
TABLETOP #19
Thermcraft is an international leading manufacturer of high quality thermal processing equipment. We manufacture low and high temperature laboratory and production furnaces, vacuum formed ceramic fiber heaters, cast heaters, heater coils, air heaters, ovens, kilns and diffusion heaters, standard or custom designed to meet your thermal requirements. At Thermcraft, customer service is our number one priority!
www.thermcraftinc.com

TRUMPF HUETTINGER, INC.
TABLETOP #6
Trumpf Huettinger, Inc. is the electronics division of Trumpf Laser and Machine Tools. We have a full line of power electronic equipment for heating, laser, and plasma applications. We are a solution provider for induction heating applications. We provide heat profile analysis including custom coil designs to meet our customer’s exact requirements.
www.trumpf.com

VERDER SCIENTIFIC, INC
TABLETOP #21
Verder Scientific Inc., comprised of the Retsch, Carbolite Gero, and ELTRA brands, sets the standard in high-tech scientific equipment serving research institutions, analytical laboratories as well as manufacturing companies for decades. The company manufactures and supplies instruments for sample preparation, elemental analysis as well as heat treatment of solid materials.
www.verder-scientific.com

VERICHEK TECHNICAL SERVICES, INC.
TABLETOP #24
WPX FASERKERAMIK GMBH
TABLETOP #3
WPX Faserkeramik GmbH develops and manufactures lightweight heat treatment components made of WHIPOX® oxide fiber ceramics (OCMC). Advantages: extreme stability against thermal and mechanical shocks, low thermal load, minimal warping, excellent bending strength. Applications: charge carriers, separating grids for cast iron or CFC charge carriers, furnace linings, gas burner nozzles.
www.wpx-faserkeramik.de

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